

Name \_\_\_\_\_

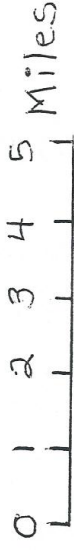
## Hohokam Canal Systems Worksheet

The Hohokam grew their crops with the use of irrigation canals. They dug miles of canals in both the Salt and Gila River valleys using only stone tools, digging sticks, and baskets. With water from the rivers, they were able to grow corn, beans, squash, and cotton in the desert.

On the next page is a map of the Hohokam canal system on the Gila River. Measure the total length of all of the canals to the nearest mile. Use the space below for your calculations. It may help to measure the canals on the north side and south side separately, then add the two measurements together.

The total length of the Gila River canal system is \_\_\_\_\_.

# Hohokam Canals of the Gila River



----- Hohokam Canals

↑  
North

## Hohokam Shell Etching Activity Worksheet



Mesquite Tree

The Hohokam made beautiful shell jewelry. They were the first to develop a method for etching shells to create designs. They used the black pitch or sap from the mesquite tree to create the design on the shell.

Then the shell was soaked in a weak acid solution, the juice from the saguaro cactus fruit. The acid in the juice ate away the surface of the shell. The design covered in mesquite pitch was protected from the acid.



Saguaro Cactus



Etched Shell

After removing the pitch, the raised design was left where the shell was protected. Lastly, the shell could be used to make jewelry.

Using modern-day products, you can create an etched shell as the Hohokam did. On a shell, paint your design using finger nail polish (a light or clear color works best). Let the polish dry. Then soak the shell overnight in vinegar. Remove the shell from the vinegar and rinse it. You will see that the shell has been etched with your design rising above the rest of the shell, just as the ancient Hohokam crafters did.

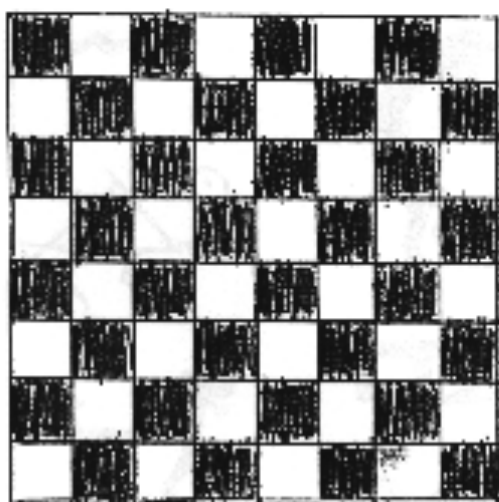
Hint: You may want to practice drawing your design on paper first.

## Hohokam Basketry Activity Worksheet

The Hohokam used different desert plants to weave baskets. Villagers collected the leaves of yucca, cattail, and bear grass to weave into various shapes. Parts of the long, black, seed pods of the devil's claw were woven into the baskets as decoration.

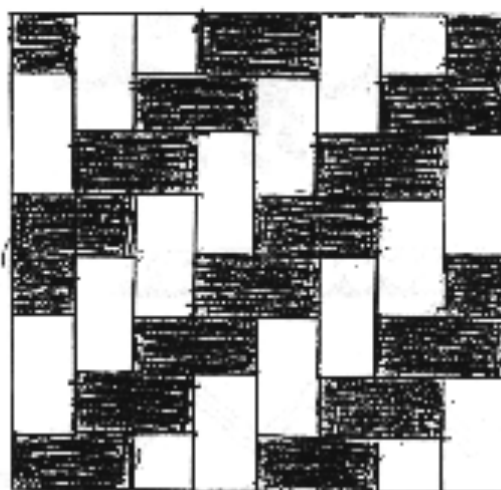
To prepare them for weaving, the leaves and seed pods were soaked in water and repeatedly split to form thin strips. Many baskets were made by coiling or looping strips around each other, stitching the coils together with a separate leaf strip. The Hohokam also made plaited baskets by weaving flat strips of material over and under one another to form a pattern. One type of plaited basket made was a mat of yucca leaves. Yucca mats were used for cooking, to dry corn, and prepare foods. They were also used as sleeping mats.

### Plaited Basketry Designs



Over-under pattern

Over-under pattern



Diagonal pattern

Diagonal pattern

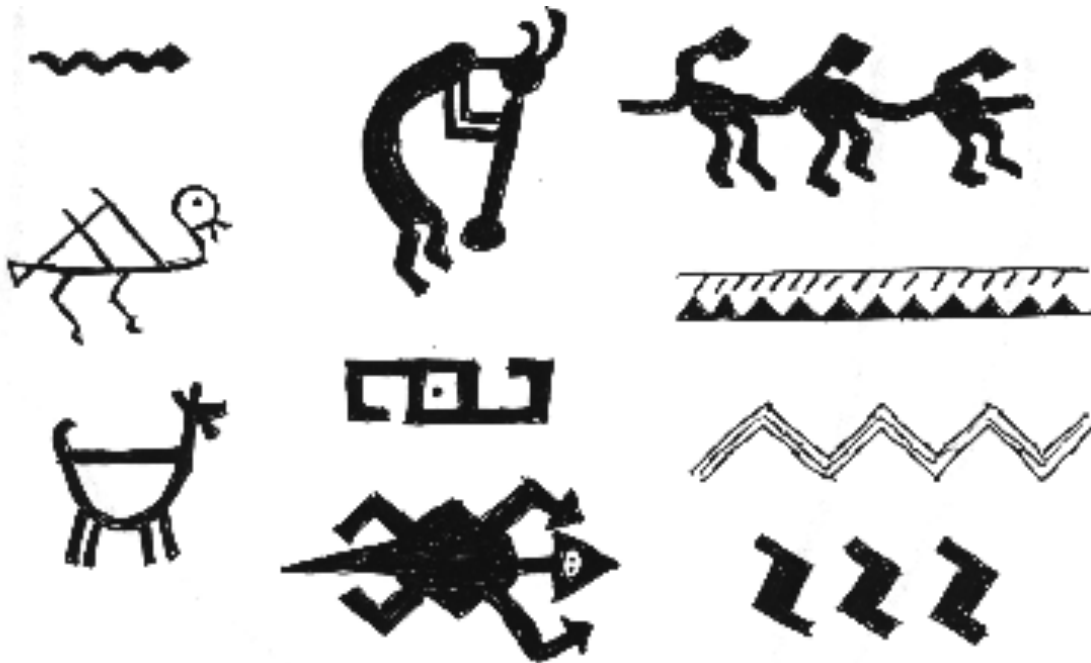
Weave a plaited mat in the same style as the Hohokam. Use construction paper strips in the same way the Hohokam used leaf strips.

Choose two different colors of strips. Use one of the two patterns shown above. For easier weaving, glue your first strip across the bottom. When you have finished weaving, glue all of the edges to help keep the strips in place.

## Hohokam Pottery Activity Worksheet

The Hohokam made pottery with clay from the desert mixed with sand found in desert washes. Their buff (light brown) pottery was often decorated with red designs using paint they made from iron pigment found in the desert. They painted the designs with brushes made from yucca leaves. Geometric designs as well as human and animal shapes were used. Some of these designs are shown below.

### Hohokam Pottery Designs

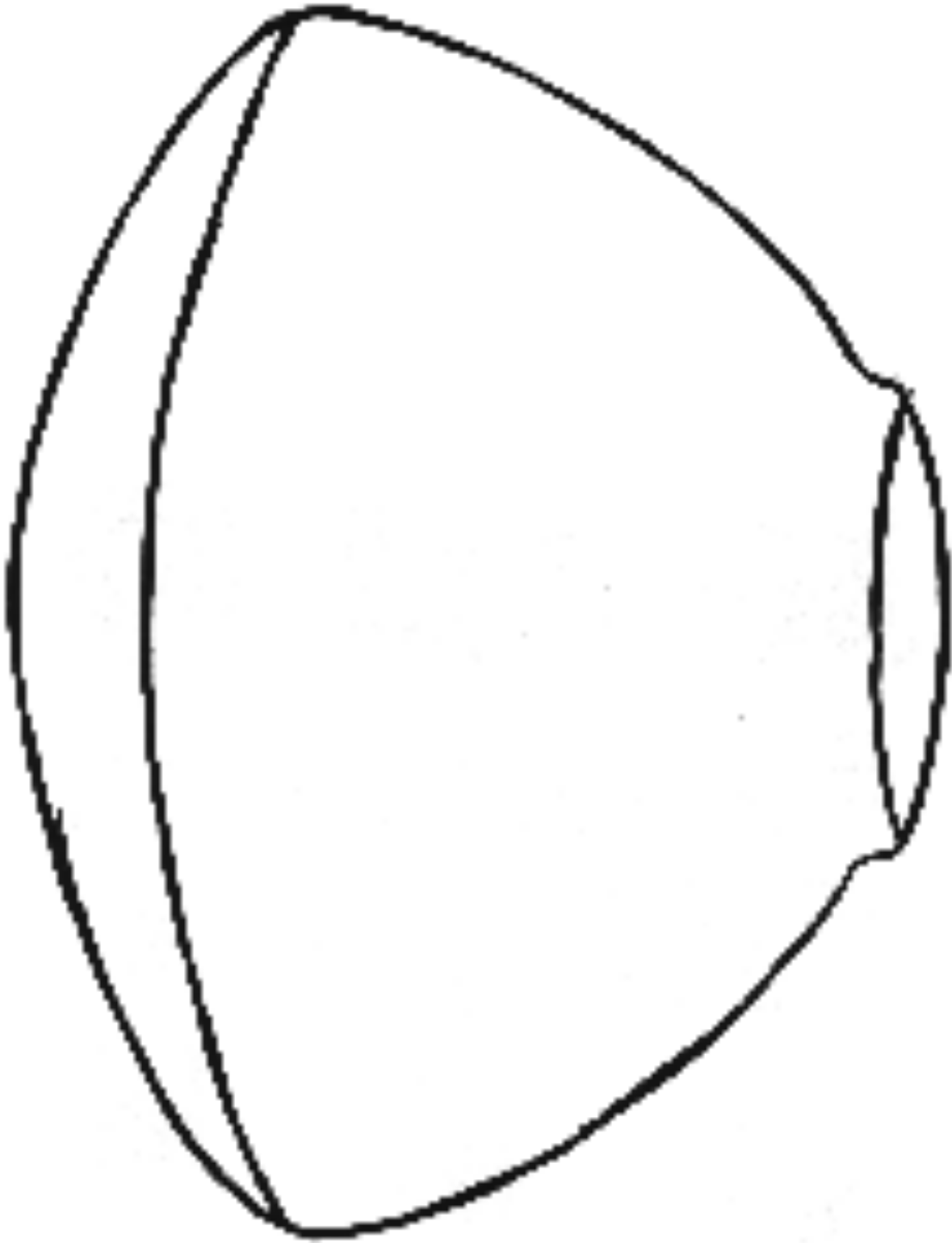


### How to Make a Yucca Brush

Make a yucca brush by placing the rectangular piece from a yucca leaf on a folded newspaper (or another rock) and gently tapping one end until you have crushed the thin outer coating off the leaf. White fibers will then be exposed. These fibers are the “brush”. Then separate the fibers carefully with your fingers and the brush is ready for painting. (Note: Pound and separate only about 1/4 to 1/2 inch back from the end for the brush.)

Use your brush to decorate the pot on the paper using a design similar to the Hohokam.

# Hohokam Pottery Activity Worksheet





## Student Reading #1

### The Hohokam, a Sonoran Desert Culture

The Hohokam Indians lived for hundreds of years in the Sonoran Desert along the rivers of southern Arizona. They were farmers who built irrigation canals and used water from the rivers to grow crops. In addition to the crops they grew, they used many desert plants for food, clothing, shelter, and other objects. They used natural resources to satisfy their basic needs.

#### The Sonoran Desert



<https://www.experiencescottsdale.com/stories/post/the-top-5-ways-to-explore-scottsdales-sonoran-desert/>

The Sonoran Desert is located in the southwestern United States and northwestern Mexico. It includes the southern half of Arizona, southeastern California, and most of the states of Sonora and Baja California, Mexico. It is a hot desert. Summer air temperatures regularly exceed 104°F, and often reach 118°F. These high near-surface temperatures interact with cool, moist air in the atmosphere to produce the violent thunderstorms of the summer monsoons.

The Sonoran Desert is thought to have the greatest variety of animals of any desert in North America. It is home to at least 60 types of mammals, more than 350 types of birds, 20 amphibians, some 100 reptiles, and about 30 species of native fish. More than 2,000 species of plants have been identified in the Sonoran Desert.

Who were the ancient Sonoran Desert people we call the Hohokam? Archeological data suggests they may have descended from an earlier hunting and gathering culture that began in this area around 5,500 B.C.E. Over time, as the area grew hotter and drier, wild plants and animals became less abundant. Domesticated corn from Mesoamerica was introduced and appears to have started a gradual change from hunting and gathering to a more settled farming existence. Adapting to the dry conditions of the desert, these early farmers learned to use water from mountain run-offs and rivers to irrigate their fields. By 300 C.E., these desert dwellers had formed a distinct culture, identified in part by their particular color and type of pottery called “red-on-buff.”

The ancient Hohokam discovered that as their villages grew, farm land next to the rivers was becoming scarce. To bring water to land farther away from the rivers, they began to dig canals around 400-500 C.E. They continued to use canals for the next thousand years. The crops grown by the ancient Sonoran Desert people eventually grew to include not only corn but several varieties of beans and squash, as well as cotton and tobacco. In addition to their crops, the Hohokam continued to make use of the many native plants and animals of the desert. These included cactus fruits, pads and buds, agave hearts (century plant), mesquite beans, and the creosote bush for medicine. The local game included birds, squirrels, rabbits, snakes and lizards, as well as fish and clams from the rivers and canals. Larger game such as mule deer and bighorn sheep could be hunted in the mountains.

The homes of the Hohokam changed over time. The earliest types consisted of large oval pits dug several feet into the ground. A brush and pole framework covered the pit, and a layer of mud was applied to the outside. Fittingly, these structures are called “pit houses.” Though pit houses continued to be used, by the 1100's more permanent, above-ground structures began to be built.



Using caliche, a natural concrete-like material found under the top soil throughout this region, they built houses with solid walls and flat, caliche-covered roofs.

Adapted from the National Park Service

Pit House Image: <https://desert.com/pithouse-architecture/>



## Student Reading #2 Adapting to Desert Life

In order for the Hohokam culture to have lived successfully for hundreds of years in the Sonoran Desert, they had to adapt to the harsh desert climate. They used desert plants for food, clothing, shelter, and other objects. They hunted animals and fished in the rivers. They used the desert's natural resources to satisfy their basic needs.



NPS photo  
Saguaro Cactus in bloom

One desert plant used by the Hohokam was the saguaro cactus. The fruit of the saguaro was picked in the summer, cooked, and made into a drink. The juice was also used as an acid to etch designs into sea shells for jewelry. Saguaro seeds were ground into flour for eating. The ribs of dead saguaros were the long poles used to pick saguaro fruit from the top of the tall cactus. The ribs were also used to cover the roofs of their houses.

Mesquite trees were also useful to the Hohokam. The pods, or beans, which grow on these trees in the spring, were ground into flour. Wood from the mesquite tree was used in building the Hohokam houses and also used for fuel. The black pitch found on the trunk of the mesquite tree was also used in etching sea shells.

Another important plant used by the Hohokam was the agave, or century plant. The stem of the agave plant is very sweet and was baked in a pit and eaten. The leaves of the agave plant were used to make string, rope, and nets. Leaves could also be made into baskets and mats. These mats had several uses, including as a mat for sleeping. Baskets were also made from the leaves of yucca, cattail, and bear grass. Parts of the long, black, seed pods of devil's claw were woven into the baskets as decoration.



NPS Photo- Jim Creager  
A Round-tailed ground squirrel

Most meat was obtained by hunting. Deer and rabbit were the most important meat sources, but the Indians also killed and ate mountain sheep, antelope, and rodents, including mice and ground squirrels. Dove, quail, duck, and geese were among the birds hunted, and Indians who lived along larger rivers also ate fish. The Hohokam also added tortoises, lizards, and snakes to their diet.

Villagers hunted larger animals with bows and arrows. Birds, mice, lizards, and snakes could have been trapped or shot with arrows. During certain seasons, Indians conducted joint rabbit hunts. They drove rabbits and other small animals into nets strung across drainage areas.

As the ancient Sonoran Desert people expanded, their contacts with neighboring tribes greatly increased. Trade increased, bringing goods and ideas from far and near. They imported turquoise, pottery, pinion nuts, obsidian (volcanic glass) and even sea shells from the Gulf of California and the Pacific Coast. From Mexico came copper bells, iron pyrite mirrors, and parrots. In exchange, the Hohokam produced extra crops for export. They also traded their finely crafted shell jewelry and pottery.

Examples of Hohokam jewelry.

NPS Photo-Dave Winchester



The beautiful shell jewelry created by the Hohokam included necklaces, bracelets, rings, earrings and pendants. Some of the shells were inlaid with turquoise and others had beautiful designs. To create raised designs on the shells, they used a technique called etching. They would paint a pattern on the shell with pitch or sap from a tree (the sap is very sticky and doesn't dissolve in water.) After the sap was dry, they would submerge the entire shell in fermented cactus juice. The cactus juice is slightly acidic and the acid in the juice would eat away the unpainted portion of the shell. After it had been in the juice long enough, they would remove it, scrape off the sap and it would leave a raised design

The Hohokam also made pottery. Villagers made pottery by mixing clay, found in layers along arroyos or gulches, with sand collected in washes. The clay was prepared by grinding, adding water, and setting aside to age for a few days. Next, the sand was sifted through basketry sifters to remove unwanted particles. Finally, potters mixed the sand and clay with water, to form the finished clay for pottery.

A potter formed each vessel from a molded clay base by adding coil upon coil of clay. She smoothed the coils together and shaped the pot with the use of a wooden paddle and stone tool called an anvil. After shaping the vessel, the potter may have decorated it with red paint made from crushed iron pigments. Iron pigments could be found in local deposits or were obtained through trade. The designs were painted on pots with brushes made from yucca leaves or grass stems. Many pots were left unpainted.

Pottery had many uses. In addition to making pots for cooking, serving, and storage, the Hohokam made ladles, scoops, figurines, and spindle whorls. Even after a pot broke, its pieces were still useful. Gaming pieces, pottery scrapers, scoops, and ornaments were some of the items made from broken pottery.

Examples of fine Hohokam pottery  
NPS Photo-Dave Winchester



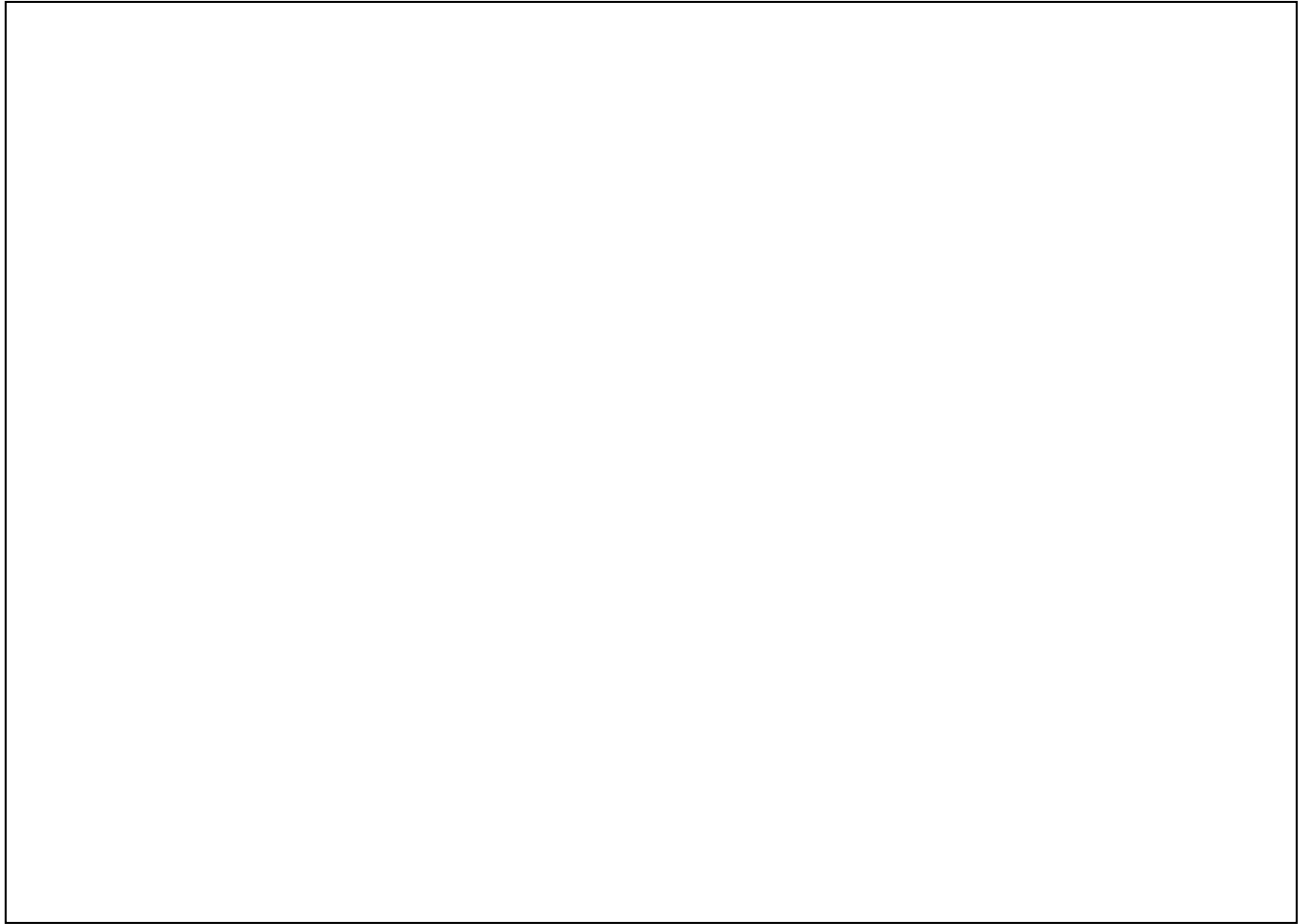
Adapted from the National Park Service

## Student Assessment

Name \_\_\_\_\_

- 1. Describe the type of environment in which the Hohokam people lived. Include information on the climate, type of plants and animals, and types of geographic features found there.**
- 2. How were the Hohokam people able to live in this type of environment?**
- 3. Describe one way in which the Hohokam changed or altered their environment.**
- 4. Describe how this change or alteration affected the people's lives and changed the place in which they lived.**
- 5. Describe two ways in which the Hohokam depended on the environment to meet their needs.**

**6. You completed an activity showing a way in which the Hohokam adapted to living in a desert. In the box below, make a drawing that shows what you did in the activity.**



**Now explain what natural resources were used by the Hohokam to create this product and how the product helped them meet their needs.**

## Student Assessment –Answer Key

Name \_\_\_\_\_

1. Describe the type of environment in which the Hohokam people lived. Include information on the climate, type of plants and animals, and types of geographic features found there. 4 points

Answer must include identifying the desert and its climate, naming at least one plant and animal that lives there, and that rivers, sandy areas, and mountains were found there. Accept reasonable responses.

2. How were the Hohokam people able to live in this type of environment? 2 points  
Answer should state that the Hohokam both adapted to and altered or changed their environment in order to live in the desert.

3. Describe one way in which the Hohokam changed or altered their environment. 2 points  
Answer should state that building canals was a way in which the Hohokam altered their environment.

4. Describe how this change or alteration affected the people's lives and changed the place in which they lived. 4 points  
Answer should include that due to canal building lives were affected by being able to grow more crops for food. More people could live there and food sources were better. They could also grow cotton to make clothes.

It must also include how the desert was changed. Crops were grown where there was desert before. The desert had more water.

5. Describe two ways in which the Hohokam depended on the environment to meet their needs. 2 points

Answer should include the following:

They used desert plants for food, clothing, shelter, and other objects.

They hunted animals and fished in the rivers.

Specific examples could be used and include:

Saguaro cactus – ate fruit, made juice from fruit, juice from fruit used to etch shell, seeds ground into flour, wood from it used in homes

Mesquite tree - pods, or beans from these trees were ground into flour, wood was used in building houses and also used for fuel. The black pitch found on tree was used to etch sea shells.



**Agave plant - baked in a pit and eaten, leaves were used to make string, rope, and nets, leaves could also be made into baskets and mats.**

**Leaves of yucca, cattail, and bear grass – used to make baskets**

**Pottery - mixed clay with sand and water; decorated with red paint made from crushed iron pigments found in desert; designs painted on pots with brushes made from yucca leaves or grass stems.**

**6. You completed an activity showing a way in which the Hohokam adapted to living in a desert. In the box below, make a drawing that shows what you did in the activity. 3 points**

**Drawing should correctly show the activity chosen by teacher.**

**Now explain what natural resources were used by the Hohokam to create this product and how the product helped them meet their needs. 3 points**

**Answer depends on which activity was chosen.**

**Shell Etching – juice from the saguaro cactus fruit, pitch or sap from the Mesquite tree, a shell**

**Basketry – yucca leaves cut into strips**

**Pottery – clay mixed with sand and water; paint made from crushed iron pigment; brushes made from yucca leaves**

**20 points possible – 16 points or 80% is passing**

### **Hohokam Canal Systems Worksheet – Answer Key**

The total length of the Gila River canal system is **approximately 82 miles.**

**Accept responses within 2 miles of this answer.**